Using Respiratory-related Calls to a Nurse Advice Line to Predict Pediatric Upper Respiratory Infection-related Healthcare Utilization

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Abstract

Using Poisson regression analysis, respiratory-related calls to a nurse advice line in Denver, Colorado were used to predict pediatric upper respiratory infection (URI) outpatient and urgent care visits. Use of electronic hospital information systems and triage software allowed for the rapid identification of respiratory-related calls and URI-related utilization. Monitoring nurse advice line call volume may help increase awareness and planning for increases in healthcare utilization.

Study Description

Objective – To use respiratory-related call volume to a nurse advice line to predict pediatric upper respiratory infection (URI) outpatient clinic and urgent care visits.

Methods - Within an integrated healthcare system (Denver Health), 4 years (1999-2002) of pediatric (0-5 years of age) URI-related healthcare utilization ([URI-HU] i.e., outpatient and urgent care) were analyzed using Poisson regression with daily respiratory-related call volume to the Denver Health NurseLine (DHNL). URI-HU was identified through Denver Health's electronic billing system using ICD-9-CM codes 465.8 and 465.9. Respiratory-related calls were identified through the DHNL's triage database where the guideline used to advise the caller was respiratory in nature (e.g., cough, breathing problems). Lags and moving averages of call counts were also modeled, while controlling for seasonal trends, linear trends, day of the week, holidays and school calendar.

Results – During the 4-year study period, 4,389 pediatric respiratory-related calls were made to the DHNL, and patients aged 0-5 years made 13,787 outpatient clinic visits and 15,505 urgent care visits. Respiratory-related DHNL calls were significant predictors of URI-HU. A 5-call increase in the 7-day moving average resulted in an 11.0% increase (95% CI 0.5, 22.7) in URI-related outpatient visits and a 24.6% increase (95% CI 13.3, 37.0) in URI-related urgent care visits.

Conclusion – Respiratory-related calls to a nurse advice line were predictive of subsequent URI-related healthcare utilization. Monitoring call volume may help increase awareness and planning for increases in utilization.